

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

IN RE APPLICATION

OF: DIETZEN ET AL.

SERIAL NO. 10/516,921

FILED: DECEMBER 07, 2004

FOR: METHOD FOR PRODUCING EXPANDABLE POLYSTYRENE

DOCKET No.: 53647

CONFIRMATION No.: 7429

GROUP ART UNIT: 1791

EXAMINER: M. J. DANIELS

Honorable Commissioner for Patents

P.O. Box 1450

Alexandria, VA 22313-1450

SUPPLEMENTAL
INFORMATION DISCLOSURE STATEMENT

Sir:

This subject Information Disclosure Statement is submitted in connection with applicants' continuing duty of disclosure under 37 C.F.R. §1.56.

The fee set forth in 37 C.F.R. §1.17(p) in the amount of - \$180.00 - is paid herewith by credit card (Form PTO-2038 enclosed).

Also, please charge any shortage in fees due in connection with the filing of this paper, including Extension of Time fees, to Deposit Account No. 14.1437. Please credit any excess fees to such deposit account.

Respectfully submitted,

NOVAK DRUCE DELUCA + QUIGG



/S. Peter Konzel/ S. Peter Konzel

Reg. No. 53,152

Customer No.: 26474
1300 Eye Street, N.W.
Suite 1000 West Tower
Washington, D.C. 20005
(202) 659-0100

Encl.: Form PTO-1449

SPK/BAS

LISTING OF RELEVANT DOCUMENTS:

The relevant documents are listed in the attached Form PTO-1449.

REMARKS:

The listed documents (AA) and (BA) through (BJ) were brought to applicants' attention in the course of appeal proceedings relating to the European counterpart of the application, EP 1 517 947 B1.

Document (BA) was published in the Japanese language and an English language translation of the document is included. Documents (AA), (BB) and (BC) were published in the English language.

Document (BD) is a Manual of an underwater granulator "SMUP 6D" manufactured by the company Gala Kunststoff- und Kautschukmaschinen GmbH. The Manual is in the German language and a translation of the document is currently not readily available.

According to an opponent/appellant in the European proceedings, the Manual provides on page 47 guidelines for troubleshooting in the event that the granulate size becomes too big. The first of the suggested measures mentions clogging of the die plate as a possible cause of the problem, and suggests as a possible relief measure an increase of the die plate temperature. The opponent/appellant further points to page 13 of the manual as suggesting to heat the die plate temperature for polystyrene to a temperature of 230°C to 340°C when the melt temperature is in the range of 200°C to 270°C. The respective information of the Manual is deemed to be cumulative to the information available in the brochure regarding "*Trends in Underwater Pelletizer Technology: ...*" of *Mack et al.* (of record).

Documents (BE) to (BH) were presented by a further opponent/appellant in the European proceedings. The documents are in the German language and an English language translation thereof is currently not readily available.

Document (BE) was presented as assertedly showing analytical data determined by the company EPFL in a GPC determination of the molecular weight of samples of commercial PS 158 K obtained in Germany and obtained in Japan. According to the opponent/appellant, the analysis of

the sample obtained in Japan yielded an M_w of 261'185 g/mol, and the analysis of the sample obtained in Germany yielded an M_w of 260'770 g/mol. The opponent/appellant asserts that the data show that a standard procedure such as GPC is not suited to reproduce the molecular weight of the commercial PS 158 K which was employed in the illustrative examples described in the application.

Documents (BF), (BG) and (BH) are asserted to show three test reports prepared by the companies Viscotek, EMPA and EPFL, in which three independent laboratories determined the M_w of polystyrol PS 158 K samples by standard GPC methods. According to the opponent/appellant, the following M_w data were determined:

Laboratory	Measurement Parameter	PS 158 K Korea	PS 158 K Europe
EPFL	M_w [g/mol]	236'493	260'770
EMPA	M_w [g/mol]	235'800	239'800
Viscotek [THF]	M_w [g/mol]	287'002	289'075
Viscotek [chloroform]	M_w [g/mol]	274'441	278'845

The opponent/appellant argues that the test results show that the determined M_w of the investigated samples differed by up to 50'000 g/mol from the M_w of the PS 158 K samples which were employed in the illustrative examples described in the application.

Documents (BI) and (BJ) were presented by a third opponent/appellant in the European proceedings. The documents are in the German language and an English language translation thereof is currently not readily available.

Document (BI) is a copy of German Industry Standard DIN-55672-1:1995-02 relating to GPC as a method for analyzing molecular weight distribution, number-average molecular weight M_n , and weight-average molecular weight M_w of polymers having a molecular weight of no more than 10^6 g/mol in tetrahydrofuran (THF) as eluent. The document is asserted to show, in sections 12, 12.1 and 12.2, that a plurality of parameters should be indicated in conjunction with any analytical value determined when GPC is used for the analysis of polystyrene, even if the parameters available for variation have already been limited by selecting THF as the solvent.

Document (BJ) is an expert opinion of Prof. Dr.-Ing. W.-M. Kulicke, University of Hamburg, Germany, including a Curriculum Vitae and a List of Publications of Prof. Dr.-Ing. W.-M. Kulicke. Opponent/appellant points out that Prof. Dr.-Ing. Kulicke has been holding the chair in technical and macromolecular chemistry of the faculty of chemistry at the University of Hamburg,

Germany, since July 1992, that he is an internationally renowned capacity in the field of polymer engineering with particular emphasis on polymer analysis, structure–property relationship of polymers and rheology of polymers, that he is author of more than 200 scientific publications in said field and received various awards for his contributions to the field, and that he was conferred the Publication Award by the Journal of Rheology, published by the American Chemical Society in 2007, for his contributions to the science of deformation and flow.

According to opponent/appellant, Prof. Kulicke addresses in subsection 2 of the opinion two independent physical effects which can be encountered when a blowing agent-containing polymer melt is extruded, namely:

- 1) Pre-expansion which is addressed in section 2.1 of the opinion. Pre-expansion is said to be caused by the expansion of the blowing agent in the gaseous phase at the die exit when the polymer has a temperature at which it can be plastically deformed by the expanding blowing agent. It is asserted that this expansion can be suppressed by rapidly cooling the extrudate by extrusion into cooled and pressurized water as the polymer is solidified and is no longer plastically deformable.
- 2) The die swell or Barus effect which is addressed in section 2.2 of the opinion. The die swell is said to be caused by the macromolecular properties of the polymer and the shear rate acting on the macromolecules in the polymer melt when it is pressed through the die. It is asserted that the shear rate depends on the viscosity of the polymer melt and therefore on the polymer melt temperature, i.e., the die swell decreases as the melt temperature increases.

Contrary to the measures mentioned in section 2.1 of Prof. Kulicke's opinion, the procedure of *Biglione et al.* mandates that the polymer be cooled at the die-head outlet "*in water or ... a fluid kept at a temperature higher than the T_g of the expandable polymer*"¹⁾ and the reference points out that "*rapid cooling allows to avoid the polymer expansion, but it presents the great drawback to induce into the granules orientations and stresses caused by quenching, which, as known, affects negatively the uniformity of the cellular structure and the performance of the expanded product.*"²⁾ Also, the explanations in section 2.2 of the opinion are deemed to be cumulative to the disclosure of *Graessley et al.* (of record).

1) Col. 2, indicated lines 46 to 49, of *US 4,606,873*.

2) Col. 2, indicated lines 3 to 8, of *US 4,606,873*.

CERTIFICATION UNDER 37 C.F.R. §1.97(E):

This Information Disclosure Statement is filed before the mailing date of any of a final action under 37 C.F.R. §1.113, a notice of allowance under 37 C.F.R. §1.311, or an action that otherwise closes prosecution in the application, and it is accompanied by the fee set forth in 37 C.F.R. §1.17(p). A certification under 37 C.F.R. §1.97(e) is therefore not required.